

WHAT IS CLAIMED IS:

1. A semiconductor device comprising:
  - a semiconductor substrate;
  - a conductive plug electrically connected to the
  - 5 semiconductor substrate;
  - a silicon carbide film provided on the conductive plug;
  - a metal compound film provided on the silicon carbide film and containing a metal carbide; and
  - 10 an electrode provided on the metal compound film.
2. A semiconductor device comprising:
  - a semiconductor substrate;
  - a conductive plug electrically connected to the
  - semiconductor substrate;
  - 15 a silicon carbide film provided on the conductive plug;
  - a metal compound film provided on the silicon carbide film and containing a metal carbide;
  - a capacitor lower electrode provided on the metal
  - 20 compound film;
  - a capacitor upper electrode provided above the capacitor lower electrode; and
  - a capacitor dielectric film provided between the capacitor lower electrode and the capacitor
  - 25 upper electrode and containing a ferroelectric material or a highly dielectric material as a major component.



3. The semiconductor device according to claim 1, wherein the conductive plug is electrically connected to an active region of a transistor provided on the surface of the semiconductor substrate.

5           4. The semiconductor device according to claim 2, wherein the conductive plug is electrically connected to an active region of a transistor provided on the surface of the semiconductor substrate.

10           5. The semiconductor device according to claim 1, wherein the metal carbide contains a carbide of titanium, zirconium, hafnium, vanadium, niobium, or tantalum.

15           6. The semiconductor device according to claim 2, wherein the metal carbide contains a carbide of titanium, zirconium, hafnium, vanadium, niobium, or tantalum.

20           7. The semiconductor device according to claim 3, wherein the metal carbide contains a carbide of titanium, zirconium, hafnium, vanadium, niobium, or tantalum.

            8. The semiconductor device according to claim 4, wherein the metal carbide contains a carbide of titanium, zirconium, hafnium, vanadium, niobium, or tantalum.

25           9. The semiconductor device according to claim 1, wherein the metal compound film further contains a compound of a metal contained in the metal carbide and



silicon.

10. The semiconductor device according to claim 2,  
wherein the metal compound film further contains a  
compound of a metal contained in the metal carbide and  
5 silicon.

11. The semiconductor device according to claim 3,  
wherein the metal compound film further contains a  
compound of a metal contained in the metal carbide and  
silicon.

10 12. The semiconductor device according to claim 4,  
wherein the metal compound film further contains a  
compound of a metal contained in the metal carbide and  
silicon.

15 13. The semiconductor device according to claim 5,  
wherein the metal compound film further contains a  
compound of a metal contained in the metal carbide and  
silicon.

20 14. The semiconductor device according to claim 6,  
wherein the metal compound film further contains a  
compound of a metal contained in the metal carbide and  
silicon.

25 15. The semiconductor device according to claim 7,  
wherein the metal compound film further contains a  
compound of a metal contained in the metal carbide and  
silicon.

16. The semiconductor device according to claim 8,  
wherein the metal compound film further contains a



compound of a metal contained in the metal carbide and silicon.

17. A method of manufacturing a semiconductor device comprising:

- 5           preparing a semiconductor substrate;
- forming a conductive plug electrically connected to the semiconductor substrate;
- forming a silicon carbide film covering an upper surface of the conductive plug;
- 10          forming a first metal film on the silicon carbide film;
- forming a second metal film on the first metal film;
- forming a dielectric film containing a
- 15          ferroelectric material or a highly dielectric material which is a major component on the second metal film;
- and
- forming a metal compound film on the silicon carbide film by heat treatment in an oxidizing
- 20          atmosphere, the metal compound film comprising a metal carbide of a metal contained in the first metal film and carbon.

18. The method according to claim 17, wherein the first metal film is a titanium film, zirconium film, hafnium film, vanadium film, niobium film, or tantalum film.

19. The method according to claim 17, further



comprising: forming a third metal film on the metal compound film; processing the third metal film, the metal compound film, the dielectric film, the second metal film, and the silicon carbide film by etching;  
5 and carrying out a heat treatment in an oxidizing atmosphere.

20. The method according to claim 18, further comprising: forming a third metal film on the metal compound film; processing the third metal film, the  
10 metal compound film, the dielectric film, the second metal film, and the silicon carbide film by etching; and carrying out a heat treatment in an oxidizing atmosphere.

21. The method according to claim 17, wherein the  
15 dielectric film is a capacitor dielectric film, and the second and third metal films are capacitor lower and upper electrodes.

22. The method according to claim 18, wherein the  
20 dielectric film is a capacitor dielectric film, and the second and third metal films are capacitor lower and upper electrodes.

23. The method according to claim 19, wherein the  
25 dielectric film is a capacitor dielectric film, and the second and third metal films are capacitor lower and upper electrodes.

24. The method according to claim 20, wherein the dielectric film is a capacitor dielectric film, and the



second and third metal films are capacitor lower and upper electrodes.